



Technology Demonstration Summary Sheet

Dual Arm Work Platform

THE NEED

During the decontamination and decommissioning (D&D) process, the handling of highly radioactive materials including lead, steel, concrete, and the dismantlement of components built from many different materials can be a long, labor intensive process that has the potential for high exposure rates, heat stress and injury to personnel.

THE TECHNOLOGY

The Dual Arm Work Platform (DAWP) was provided by a consortium of national laboratories and industry manufacturers. Individual components and subassemblies were purchased from or provided by Schilling Robotics Systems, Redzone Robotics, Inc., ORNL and INEEL.

The platform is designed to be suspended from a crane for remote positioning. The platform houses various electrical and hydraulic systems needed to operate the two Schilling manipulator arms and provides support for the tooling and end effectors. The current system can be operated by someone approximately 250 feet away without direct line-of-sight.

The Titan III manipulator arms are made from titanium and stainless steel. The arms provide six degrees-of-freedom and are powered by a 3000 psi hydraulic system. Each arm is capable of lifting 240 lbs. The grippers on the arms are capable of exerting a 1000 lb. crushing force and a rotational torque of 75 lb-ft.

Various power tools were specially adapted for use with the manipulator arms. The tools ranged from crow bars to sophisticated saws that have built-in oil cooling systems and were operated from the control panel.

THE DEMONSTRATION

The demonstration was performed at the Argonne National Laboratory (ANL) CP-5 Research Reactor from June through September 1997. The DAWP's ability to remotely cut and dismantle the aluminum reactor tank; disassemble the boral, steel and aluminum subassemblies; and transfer these materials to a staging area was tested.



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THE RESULTS

The Dual Arm Work Platform removed 3000 lbs. of graphite blocks, 1400 lbs. of lead sheeting, 620 lbs. of boral, 2000 lbs. of carbon steel; untorqued and removed 38 carbon steel studs; size reduced and dismantled a significant portion of the aluminum reactor tank (following approximately 200 linear feet of cuts through 3/8 - 3/4" aluminum plating), and removed the resultant 400 lbs. of aluminum plate from the reactor tank assembly.

The DAWP was controlled by two operators working in an adjacent control room. In this way, personnel could maintain a safe distance from the radiation in the CP-5 reactor. The DAWP was operated in a radiation field averaging 0.75 to 25.0 R/hr for the duration of this work. By using this remote system versus direct manual means, significant radiation exposure to workers was avoided.

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CP-5 LARGE SCALE DEMONSTRATION PROJECT

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